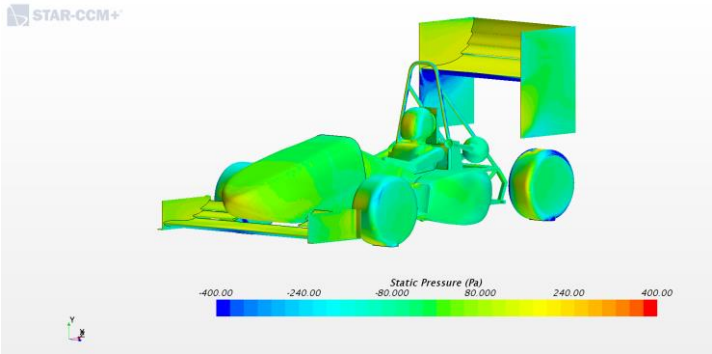
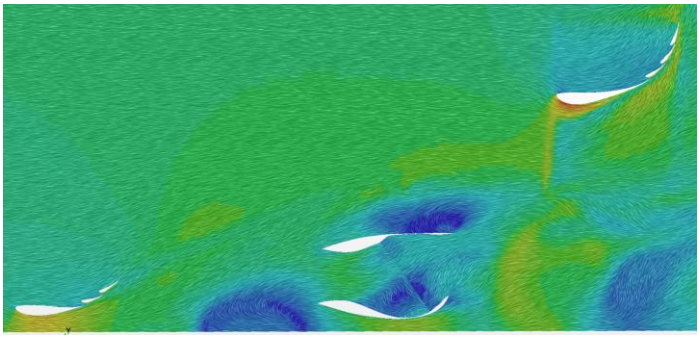
Formula Racing Innovation with HPCBOX

Computational fluid dynamics (CFD) simulations are a major part of our team's design processes and have been a source of huge improvements in the past. However, limitations in hardware can limit the scope of our simulations and traditional HPC solutions, while powerful, can be somewhat unintuitive to use. As our team needs to run on tight deadlines to produce a new vehicle every year, we want to maximize time spent running simulations, and avoid the limitations of running simulations locally.

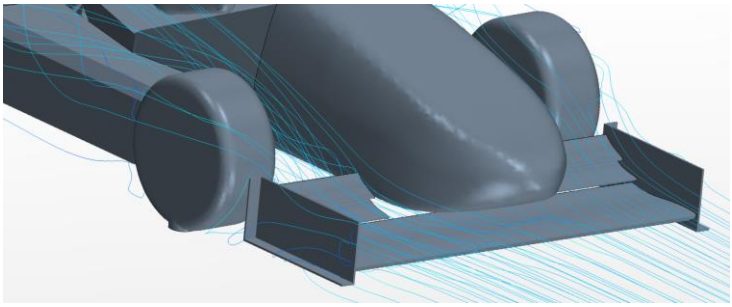
The University of Toronto Formula Racing (UTFR) team is a student lead design team focused on the design fabrication and racing of a small formula style racecar. The team competes internationally against other university teams in the FSAE and Formula Student divisions of racing. As with most racing, aerodynamic design plays a huge role in lap time and vehicle performance. UTFR constantly strives to improve its designs and to make use of the latest tools and techniques.



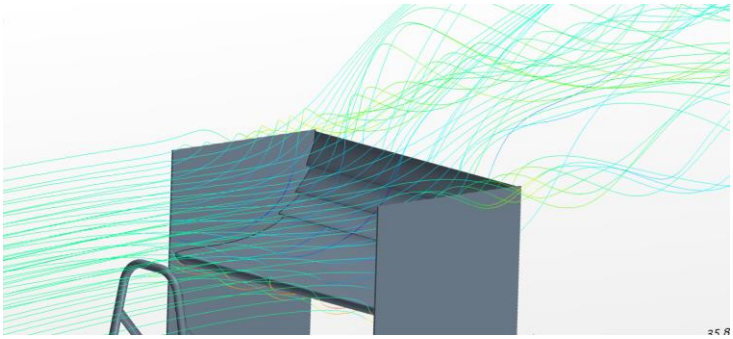
Static Pressure



Velocity Cross-section



Front Wing Steamlines



Rear Wing Steamlines

At-a-glance:

Customer: University Of Toronto Formula Racing

Website: https://www.fsaeutoronto.ca

Customer Size:1 -10

Country: Canada

Industry: Formula Racing

Products and Services: HPCBOX on Microsoft Azure

Drizti Inc., UTFR & Microsoft Azure

Customer challenges

UTFR wanted to widen the scope of their design for the 2020 car, but the limitations imposed by their existing hardware and the requirement to manually script complex design processes they wanted to execute with Siemens Simcenter STAR-CCM+ was limiting their progress. With tight timelines and budget being an important factor, they were looking for a way to accelerate their design and improve collaboration among engineers in the most efficient way possible.

Drizti HPCBOX Solution

Drizti's HPCBOX solution on Microsoft Azure, delivers a desktop-centric, workflow enabled cloud HPC Platform with a rich user experience making supercomputing as easy to use as a personal computer. HPCBOX lets users harness Microsoft Azure's Big Compute Infrastructure through its rich user experience and desktop-centric workflow system. With HPCBOX, applications can be run in parallel with their native GUI significantly reducing the time involved in developing products and allowing end users to focus on their innovation.

Customer Benefits

HPCBOX provided UTFR with a very streamlined and intuitive HPC solution. Instead of submitting jobs into a queue using batch or script files, job parameters like numbers of partitions, licensing information, etc. could be declared in the HPCBOX app, requiring no programming from the user. Set-up, running the simulation, and interactively visualizing results allowed the engineers to focus on design rather than on programming.

Without local hardware investment our designers could work on our largest simulation mesh and results from their personal laptops. The only requirement for running CFD studies with HPCBOX was a stable internet connection.

We were also able to use HPCBOX as a collaboration tool as multiple users could be connected to the same node simultaneously. This helped to facilitate troubleshooting as more experienced users could remote in and see exactly what was happening in real time.

We were able to look at a wider scope with HPCBOX. For a small team with tight timelines like us, being able to avoid programming and spend more time running CFD studies is invaluable. HPCBOX helped us hit our deadlines and come out ahead during this year's design cycle.

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Learn More

https://www.drizti.com

https://www.fsaeutoronto.ca/